CITY OF GENESEE (PWS 2290015)
SOURCE WATER ASSESSMENT FINAL REPORT

February 25, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for the City of Genesee, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Genesee drinking water system consists of two ground water wells: Well #3 SW and Well #5 NW. Well #3 is located near the corner of E. Chestnut and N. Laurel Avenue on the south end of the City of Genesee. Well #5 is located slightly north of the City of Genesee along North Beach Road. The drinking water from Well #5 is stored in a 300,000-gallon steel standpipe and the drinking water from Well #3 is stored in a 275,000-gallon partially buried, concrete reservoir. Hypochlorinators are used to disinfect the drinking water at the reservoirs before it flows to the distribution system. The system currently serves 775 people through 344 connections.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential Contaminants/Land Uses are divided into four categories: inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, both wells of the City of Genesee rate high for all potential contaminant categories: IOCs, VOCs, SOCs, and microbial contaminants. According to the 1995 Ground Water Under Direct Influence (GWUDI) field survey, North Beach Road runs within 50 feet of Well #5, resulting in automatic high susceptibility ratings for all potential contaminant categories. A radius of 50 feet around the wellhead is known as the 1A zone or sanitary setback. Drinking water sources that have contaminants in this zone are considered highly vulnerable to contamination. Additionally, the State Drinking Water Information System (SDWIS) shows several detections of the VOC tetrachloroethylene in water samples taken from Well #3, resulting in an automatic high susceptibility for VOCs. Any detection of a VOC or an SOC at a drinking water source, regardless of the amount, results in high susceptibility for that contaminant category. The location of Well #3 within the city, exposing it to more potential contaminants contributed to the overall high susceptibility of the well. The predominant irrigated agriculture land use within the area of both wells contributed to the susceptibility of the drinking water system.

No SOCs have ever been detected in the system and no VOCs have been detected at Well #5. Trace concentrations of the IOCs cadmium, fluoride, and nitrate have been detected in Well #5, but at concentrations significantly below maximum contamination levels (MCLs) as set by the EPA. Sodium, an unregulated chemical, was detected at low levels in both wells. Alpha and beta particles (radionuclides) have been detected in the distribution system and in both wells but at levels below the MCLs. Total coliform bacteria have been detected in the distribution system from 1993 to 1998 with repeat detections in November 1993, October 1995, June and July 1996, and July 1998. However, no coliform bacteria have been detected at either of the wells.

The predominant irrigated agricultural land use of the area may have led to the county level herbicide use and the total county level ag-chemical use being rated as high. In addition, both well delineations cross a nitrate priority area. A priority area is an area where greater than 25% of the wells/springs show nitrate values greater than 5 milligrams per liter (mg/L).

Nitrate was detected in Well #3 at levels greater than one-half the MCL of 10 mg/L. In September 1994, nitrate was detected at 5.47 mg/L and again in June 2002 at 5.4 mg/L. EPA requires reporting in the Consumer Confidence Report (CCR) if concentrations of regulated compounds are greater than half their MCL. Further information and health side effects can be researched at http://www.epa.gov/safewater/ccr1.html.

Tetrachloroethylene or perchloroethylene (PERC) was detected several times in water samples taken from Well #3 from 1992 to 1997. The levels of detection ranged from as high as 7.9 μg/L in December 1992 to1.94 micrograms per liter (μg/L) in September 1994. PERC is a primary solvent used in dry cleaning. Short-term exposure in drinking water may cause serious abdominal pain, skin rash, and eye irritation. Long-term exposure may cause liver and kidney damage, nervous system damage, and cancer (International Occupational Safety and Health Center, 2003).

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the sites should be reserved and protected for this specific use.

For the City of Genesee, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Actions should be taken to keep a 50-foot radius perimeter clear of all potential contaminants from around the wellhead. The City of Genesee may need to consider limiting access to North Beach Road that runs within 50 feet of Well #5 to protect the drinking water from contamination in the event of an accidental spill or release. Additionally, the city may need to implement engineering controls to eliminate the detection of PERC in Well #3 and lower the levels of nitrate in the drinking water system. Any contaminant spills within the delineations should be carefully monitored and dealt with. As much of the designated protection areas are outside the direct jurisdiction of the City of Genesee drinking water system, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the wells should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus on any drinking water protection plan as the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Idaho Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Latah Soil and Water Conservation District, and the Natural Resource Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific bet management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF GENESEE, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the EPA to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The local community, based on its own needs and limitations, should determine the decision as to the amount and types of information necessary to develop a drinking water protection program. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Genesee drinking water system consists of two ground water wells: Well #3 SW and Well #5 NW. Well #3 is located near the corner of E. Chestnut and N. Laurel Avenue on the south end of the City of Genesee. Well #5 is located slightly north of the City of Genesee along North Beach Road. The drinking water from Well #5 is stored in a 300,000-gallon steel standpipe and the drinking water from Well #3 is stored in a 275,000-gallon partially buried, concrete reservoir. Hypochlorinators are used to disinfect the drinking water at the reservoir before it flows to the distribution system. The system currently serves 775 people through 344 connections (Figure 1).

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The predominant irrigated agricultural land use of the area may have led to the county level herbicide use and the total county level ag-chemical use being rated as high. In addition, both well delineations cross a nitrate priority area. A priority area is an area where greater than 25% of the wells/springs show nitrate values greater than 5 mg/L.

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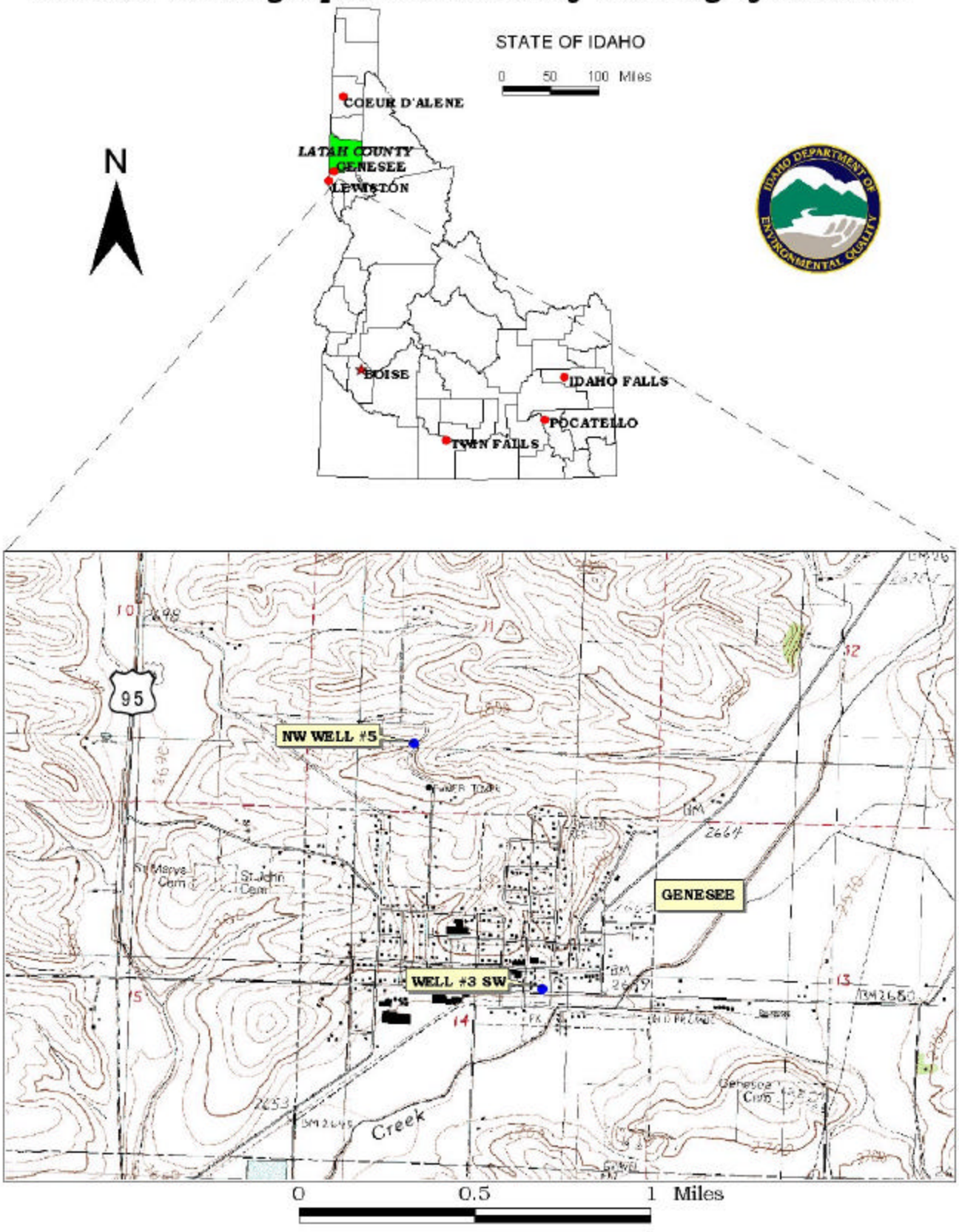
PERC was detected several times in water samples taken from Well #3 from 1992 to 1997. The levels of detection ranged from as high as 7.9 μg/L in December 1992 to 1.94 μg/L in September 1994. PERC is a primary solvent used in dry cleaning. Short-term exposure in drinking water may cause serious abdominal pain. Long-term exposure may cause liver and kidney damage, nervous system damage, and cancer (International Occupational Safety and Health Center, 2003).

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT zones for water in the vicinity of the City of Genesee wells. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including operator input, local area well logs, and hydrogeologic reports (detailed below).

FIGURE 1. Geographic Location of the City of Genesee



The City of Genesee is located at the northern edge of the Clearwater Embayment – the easternmost extent of the Columbia River Basalt Group (CRBG). The area is underlain by crystalline basement rocks consisting of Precambrian Belt Supergroup and Mesozoic Idaho Batholith rocks. Surficial sediments of the Palouse Loess and more recent alluvium cover the basalt in most of the area. The two source wells that serve the town fully penetrate the Grande Ronde basalt of the CRBG. In both wells, most of the water is drawn from the Wanapum aquifer (Lawrence, 1995) consisting of the Wanapum basalt and the Vantage interbed.

The conceptual hydrogeologic model for the Genesee source wells is based on interpretations presented by Lawrence (1995), available well logs and published geologic maps of the area. Bedrock geology is based on the geologic map of the Pullman quadrangle at a scale of 1:250,000 (Rember and Bennett, 1979). Granite of the Idaho Batholith and basement metamorphic rocks bound the basin to the north, west and east.

There are two active wells that supply water for the City of Genesee. Well logs are not available for either of the two source wells. Well #3 and Well #5 pump an average of 92 gallons per minute (gpm) and 139 gpm, respectively. The static water level in both wells is 2641 feet above mean sea level (Lawrence, 1995). Inactive city wells and neighboring private wells were used for test points.

The Genesee area is located within the Columbia River Basalt plateau, near the northern edge of the Clearwater Embayment. It is bounded to the north, northwest and east by the crystalline rock of Paradise Ridge and the southeast extension of Tomer Butte, and to the south by the Clearwater River Canyon in Lewiston. The western boundary is not hydrologically defined. Faulting in the area is difficult to define (Lawrence, 1995); however Lawrence (1995) shows two parallel northwest-southeast trending faults just east of Genesee. No faults have been definitively identified in the Genesee area (Lawrence, 1995).

The general direction of ground water flow is to the southwest toward the Clearwater River. However, a ground water pumping center (cone of depression) forms at Genesee, according to interpretations in Lawrence (1995) and based on test point data.

No-flow boundaries are placed in the model to represent the boundaries between the basalt and granite and crystalline rock. A no-flow boundary is also placed along the Clearwater and Snake Rivers because flow does not occur under the river through the Wanapum aquifer. None of the faults are known to be hydrogeologic barriers and are therefore not included in the models.

A negative constant flux boundary is placed along the Clearwater and Snake Rivers (55,000 meters long segment) at an estimated flux of 200 gpm to simulate ground water discharge into the canyon.

A constant head boundary is placed to the north of the confluence of the Snake and Clearwater Rivers a few hundred meters and is approximately 1,500 meters long. This boundary does not actually exist; the model requires a constant head boundary for a reference head. The boundary is placed at this location to establish the direction of the hydraulic gradient.

Lawrence (1995) shows two sinks in the town of Genesee. The WhAEM model cannot generate multi-directional gradients (likely to exist between separate sinks) with the known data; thus the general southwest ground water direction is used to develop the capture zones. Therefore, the model will not have good calibration using the test points.

Using values in Lum et al. (1990) for the Moscow area, Lawrence (1995) proposed a recharge rate of 2.25 inches per year (in/yr), but concluded the estimate is probably too high. Comparison of water level elevations in the source well aquifer and in a deeper aquifer in the Grande Ronde basalt indicate that a downward gradient exists in the Wanapum aquifer (Lawence, 1995). Recharge is primarily via infiltration or precipitation. A recharge value of 2.2 in/yr was deemed appropriate for the Genesee source wells model.

The WhAEM model is used to delineate the capture zones. The capture zones delineated herein are based on limited data and must be taken as best estimates. If more data become available in the future these delineations should be adjusted bases on additional modeling incorporating the new data.

The delineated area for Well #3 of the City of Genesee can best be described as a fan-shaped corridor trending northeast from the City of Genesee following Cow Creek for approximately 2.5 miles (Figure 2). The delineated area for Well #5 of the City of Genesee can best be described as a northeast-trending corridor that extends from the well near the water tower on the northwest side of town for approximately 2.25 miles (Figure 3). The actual data used by the University of Idaho in determining the source water assessment delineation areas is available from DEQ upon request.

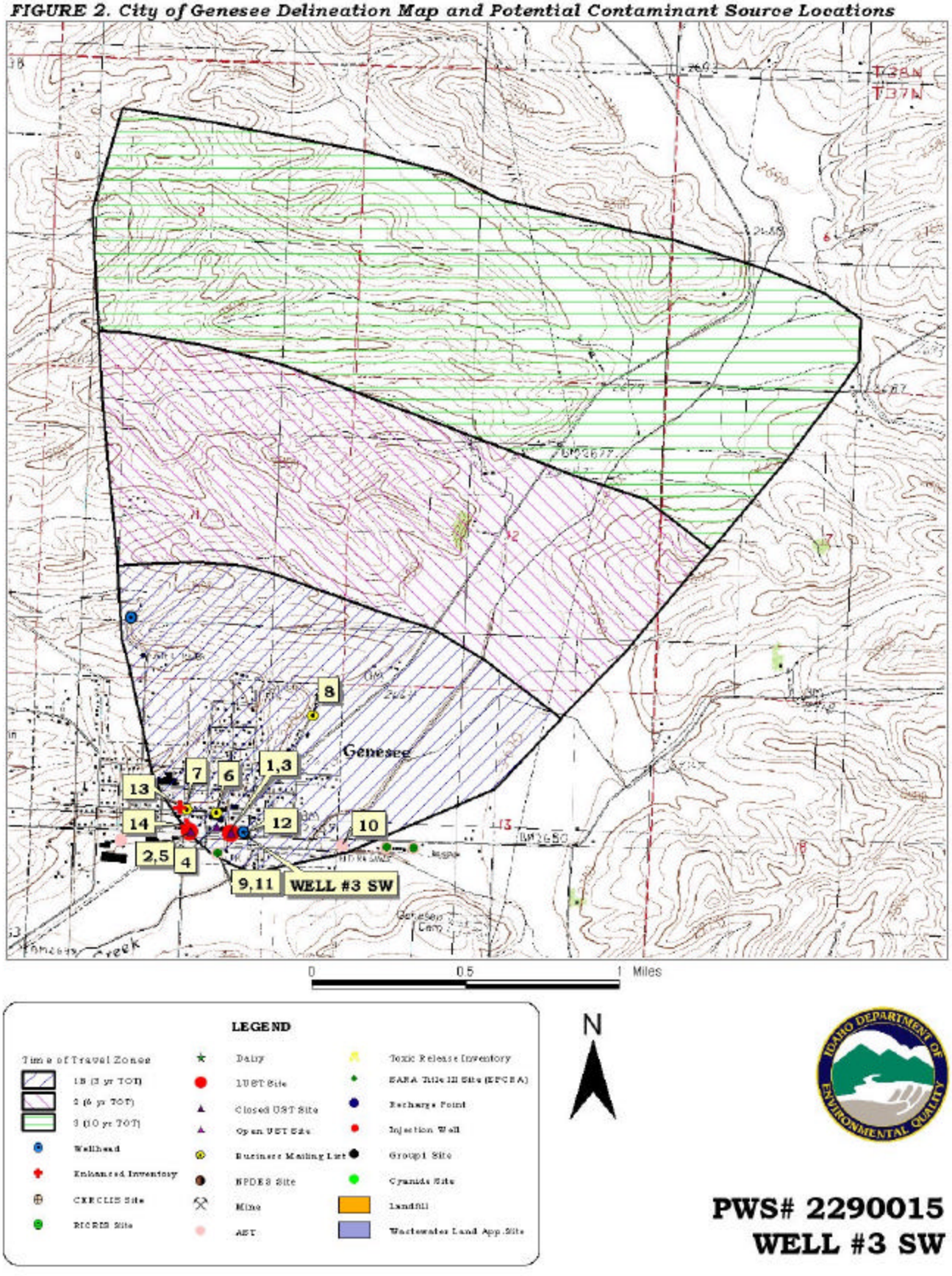
Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area and the surrounding area of the City of Genesee wells is predominantly agricultural.

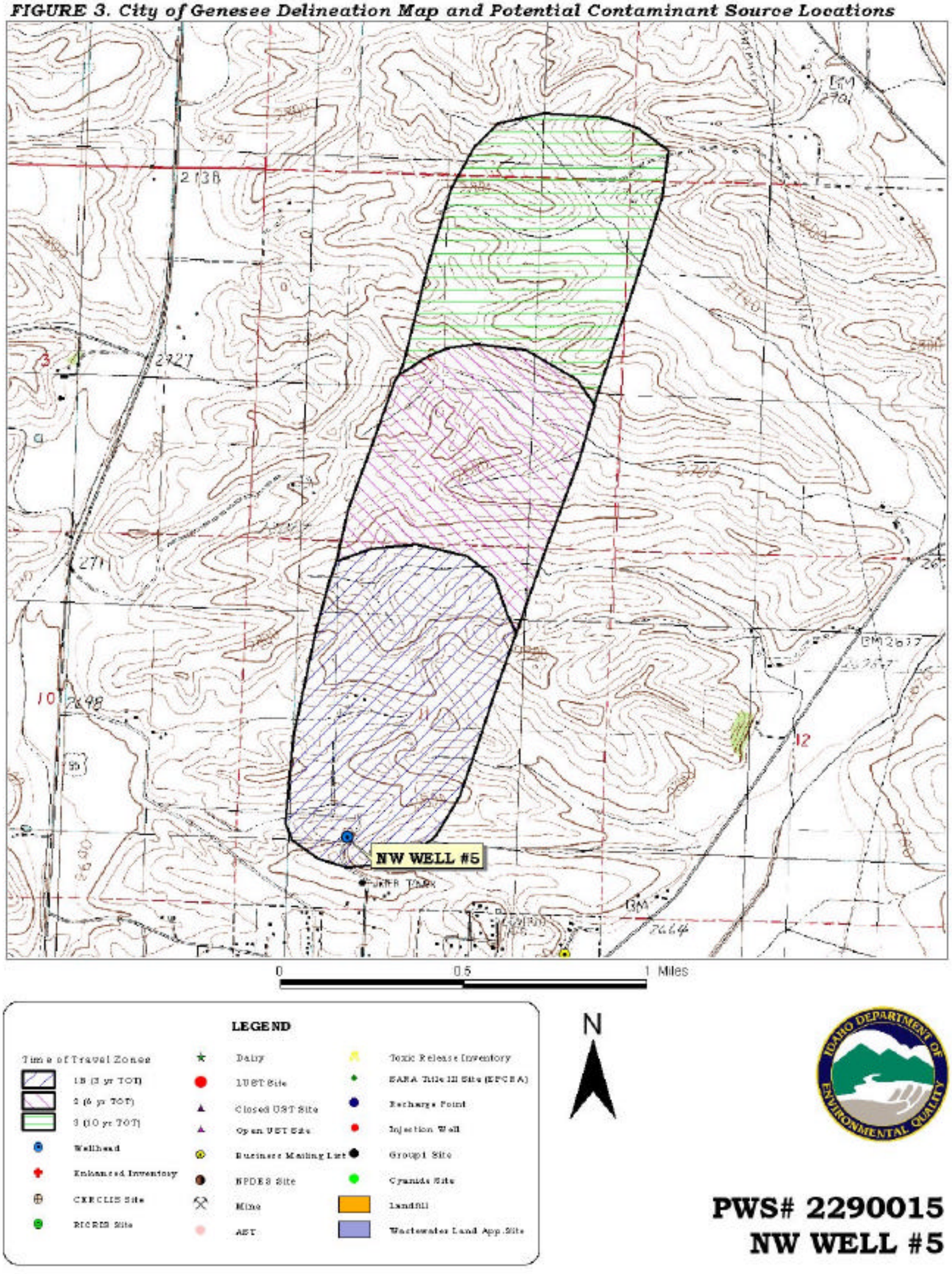
It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

FIGURE 2. City of Genesee Delineation Map and Potential Contaminant Source Locations



PWS# 2290015
WELL #3 SW

FIGURE 3. City of Genesee Delineation Map and Potential Contaminant Source Locations



Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in November and December 2002. The first phase involved identifying and documenting potential contaminant sources within the City of Genesee source water assessment areas (Figure 2 and Figure 3) through the use of field surveys, computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the area.

The delineated source water assessment area of Well #3 of the City of Genesee contains old Highway 95, Cow Creek, a few leaking underground storage tank (LUST) sites, underground storage tank (UST) sites, a fire department, a landscaping contractor, an excavating contractor, a site regulated under the Superfund Amendments and Reauthorization Act (SARA), a few aboveground storage tank (AST) sites, a dry cleaners, and an automobile service garage that has an AST. Additionally, the 1995 Ground Water Under Direct Influence (GWUDI) field survey indicates that Chestnut Road runs within 500 feet of Well # 3 and a sewer line lines underneath Chestnut Road. Table 1 lists the potential contaminant sources within the delineation of Well #3.

According to the 1995 GWUDI, the delineated area of Well #5 includes North Beach Road that runs within 50 feet of the wellhead and some cattle within 500 feet of the wellhead. The road that runs within 50 feet of Well #5 lies within the sanitary setback of the well, also known as the 1A zone. Table 2 lists these potential contaminant sources.

Table 1. City of Genesee, Well #3, Potential Contaminant Inventory and Land Use

Site	Description of Source[1]	TOT[2] Zone	Source of Information	Potential Contaminants[3]
1, 3	LUST-Site Cleanup Incomplete, Impact: Unknown; UST-Closed	0-3 YR	Database Search	VOC, SOC
2, 5	LUST-Site Cleanup Completed, Impact: Unknown; UST-Closed	0-3 YR	Database Search	VOC, SOC
4	UST-Closed	0-3 YR	Database Search	VOC, SOC
6	Fire Departments	0-3 YR	Database Search	IOC, VOC, SOC
7	Landscape Contractors	0-3 YR	Database Search	IOC, SOC, Microbials
8	Excavating Contractors	0-3 YR	Database Search	IOC, VOC, SOC
9, 11	SARA Site; AST	0-3 YR	Database Search	IOC, VOC, SOC
10	AST	0-3 YR	Database Search	VOC, SOC
12	Group 1	0-3 YR	Database Search	IOC
13	UST-Closed	0-3 YR	Enhanced Inventory	VOC, SOC
14	Dry Cleaners	0-3 YR	Enhanced Inventory	IOC, VOC
	Old Highway 95	0-10 YR	GIS Map	IOC, VOC, SOC, Microbials
	Cow Creek	0-10 YR	GIS Map	IOC, VOC, SOC, Microbials
	Chestnut Road	0-3 YR	1995 GWUDI Survey	IOC, VOC, SOC, Microbials
	Sewer line	0-3 YR	1995 GWUDI Survey	IOC, Microbials

[1] LUST = leaking underground storage tank, UST = underground storage tank, SARA = Superfund Amendments and Reauthorization Act, AST = aboveground storage tank

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Genesee, Well #5, Potential Contaminant Inventory and Land Use

Site	Description of Source[1]	TOT[2] Zone	Source of Information	Potential Contaminants[3]
	Cattle	0-3 YR	1995 GWUDI Survey	IOC, Microbials
	North Beach Road	0-3 YR (1A)	1995 GWUDI Survey	IOC, VOC, SOC, Microbials

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead, 1A = sanitary setback of the well

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheets for the system. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity rated moderate for both wells of the City of Genesee. The moderate scores were based upon poor to moderately drained soil classes as defined by the National Resource Conservation Service (NRCS). Poor to moderately draining soils tend to impede the migration of contaminants to the aquifer. However, well logs were unavailable, limiting the information concerning the composition of the vadose zone, the depth to first ground water, and the presence of any fine-grained zones that could create an aquitard above the producing zone.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced. A sanitary survey was conducted in 2001 for the system.

The system construction of both wells of the City of Genesee is moderately susceptible. The well logs were unavailable, limiting the data concerning the thickness, diameter, and depth of the casing, the placement of the annular seal, the location of the highest production zone, and the depth of the static water level. However, according to the 2001 sanitary survey, the wellhead and surface seals of both wells are maintained to standards and both wells are vented properly. Additionally, both wells are properly protected from surface flooding and are located outside a 100-year floodplain.

Though the wells may have been in compliance with standards when they were completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. In this case, there was insufficient information to determine if the wells meet construction standards.

Potential Contaminant Source and Land Use

Well #3 of the City of Genesee rated high for IOCs (e.g. nitrates, arsenic), VOCs (e.g. petroleum products, chlorinated solvents) and SOCs (e.g. pesticides), and moderate for microbial contaminants (e.g. bacteria). Well #5 rated high for IOCs, moderate for VOCs and SOCs, and low for microbial contaminants. Because Well #3 is located within the city limits, more potential contaminant sources surround the well, contributing to the land use scores. The predominant agricultural land uses that surround the wells contributed to the land use scores of both wells.

Final Susceptibility Ranking

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or repeated detections of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. PERC, a VOC, was detected several times from 1992 to 1997 at Well #3, resulting in an automatic high susceptibility for VOCs. Additionally, if there are contaminant sources located within 50 feet of the source then the wellhead will automatically get a high susceptibility rating. According to the 1995 GWUDI field survey, North Beach Road runs within 50 feet of Well #5, resulting in automatic high susceptibility scores for all potential contaminant categories. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking. Both wells rate highly susceptible to all potential contaminant categories.

Table 3. Summary of City of Genesee Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #3	M	H	H	H	M	M	H	H(*)	H	H
Well #5	M	H	M	M	L	M	H(*)	H*	H*	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
- **= An automatic high susceptibility due to a road that runs within 50 feet of the wellhead**

(*) = An automatic high susceptibility due to a detection of PERC at Well #3 or a road that runs within 50 feet of the wellhead in addition to a high number of points

Susceptibility Summary

In terms of total susceptibility, both wells of the City of Genesee rate high for all potential contaminant categories. According to the 1995 Ground Water Under Direct Influence (GWUDI) field survey, North Beach Road runs within 50 feet of Well #5, resulting in automatic high susceptibility ratings for all potential contaminant categories. A radius of 50 feet around the wellhead is known as the 1A zone or sanitary setback. Drinking water sources that have contaminants in this zone are considered highly vulnerable to contamination. Additionally, the State Drinking Water Information System (SDWIS) shows several detections of the VOC PERC in water samples taken from Well #3, resulting in an automatic high susceptibility for VOCs. Any detection of a VOC or an SOC at a drinking water source, regardless of the amount, results in high susceptibility for that contaminant category. The location of Well #3 is within the city, exposing it to more potential contaminants and contributing to the overall high susceptibility of the well. The predominant irrigated agriculture land use within the area of both wells contributed to the susceptibility of the drinking water system.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Genesee, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. Actions should be taken to keep a 50-foot radius perimeter clear of all potential contaminants from around the wellhead. The City of Genesee may need to consider limiting access to North Beach Road that runs within 50 feet of Well #5 to protect the drinking water from contamination associated with this road. Additionally, the city may need to implement engineering controls to eliminate the detection of PERC in Well #3 and lower the levels of nitrate in the drinking water system. Any contaminant spills within the delineation should be carefully monitored and dealt with. As much of the designated protection areas are outside the direct jurisdiction of the City of Genesee drinking water system, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the wells should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus on any drinking water protection plan as the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Idaho Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Latah Soil and Water Conservation District, and the Natural Resource Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, mlharper@idahoruralwater.com, Idaho Rural Water Association, at 208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system.These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Appendix A

City of Genesee
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

$\geq$ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : GENESEE CITY OF Well# : WELL #3 S W

Public Water System Number 2290015 2/25/03 12:22:18 PM

1. System Construction		SCORE
Drill Date	1964	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2001
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		4

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	10	13	12	5
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	14	13	12	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		18	16	16	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		30	26	28	14
4. Final Susceptibility Source Score		14	13	14	13
5. Final Well Ranking		High	High	High	High

Ground Water Susceptibility Report Public Water System Name : GENESEE CITY OF Well# : N W WELL #5
Public Water System Number 2290015 2/25/03 12:22:01 PM

1. System Construction		SCORE
Drill Date	1980	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2001
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		4

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2

Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	1	1	2
(Score = # Sources X 2) 8 Points Maximum		4	2	2	4
Sources of Class II or III leacheable contaminants or	YES	6	1	1	
4 Points Maximum		4	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	7	7	8

Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		3	2	2	0

Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		2	1	1	0

Cumulative Potential Contaminant / Land Use Score		23	12	14	10
4. Final Susceptibility Source Score		13	10	11	12
5. Final Well Ranking		High	High	High	High